



A Nuclear Services and Waste Management Company



Technical Services - Automated Survey and Instrumentation

Perma-Fix's Nuclear Services Division provides full service health physics and radiological protection/engineering that supports ongoing nuclear operations at facilities as well as sites undergoing decommissioning. This support includes plans, procedures, training and implementing innovative

technologies for site clean-up. Our Health Physics and Radiological Control subject matter experts whom are frequently utilized by Federal and State agencies are available to consult with clients for their radiological projects.

Detection and Characterization: GPS/GIS-Linked Open Area Walk-Over/Drive-Over Surveys

To cover large areas of land potentially impacted with radioactive material, Perma-Fix uses its cost effective automated technologies that allow for the rapid collection of survey data into a data base. A Global Positioning System (GPS) is linked to a variety of survey meter and detector combinations. Perma-Fix technicians can cover large areas quickly with multiple detector arrays mounted to an all-terrain vehicle (ATV) or sport utility vehicle (SUV). The system uses a Geographic Information System (GIS) to plot the locations of survey meter readings on a variety of background reference formats including AutoCAD civil or topographic surveys, Light Detection and Ranging (LIDAR) images, and other orthographic image sources.

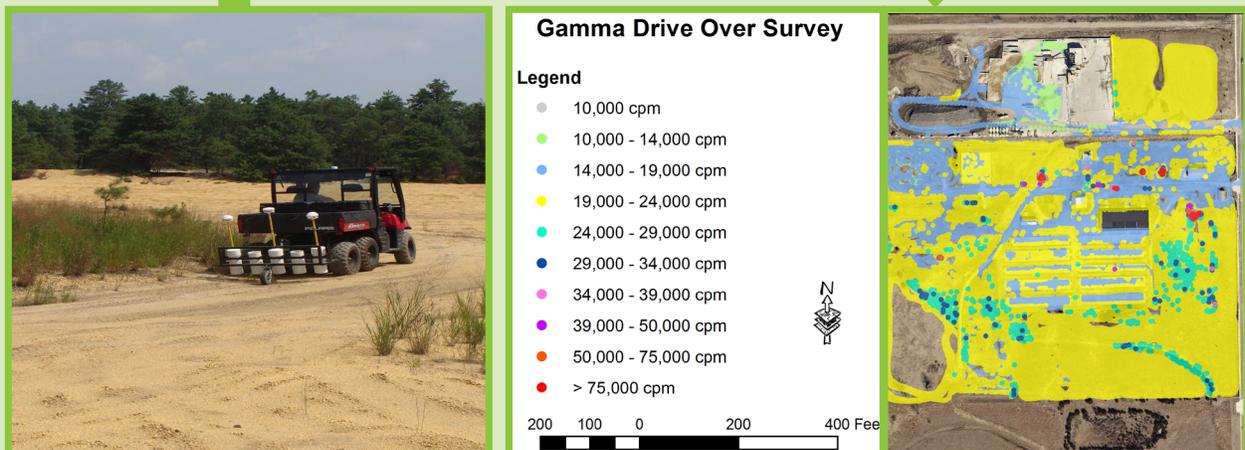
survey data to facilitate remediation. Perma-Fix has conducted more than 2,000 such surveys for U.S. Army Corps of Engineers (USACE) at the Linde/Praxair Formerly Utilized Sites Remedial Action Program (FUSRAP) Site, to determine where excavation of contaminated soil should take place and how deep to make the excavations. Soil was removed in 6-to-12-inch lifts followed by a GPS/GIS-linked survey and real time production of contaminant concentration maps. The process was then repeated until soil with contaminants levels below the target cleanup level was found. This process produces a cost effective and immediate way to characterize large areas.

System Reduces Work Effort and Waste Disposal Costs

In as little as 24 hours after data collection, Perma-Fix is able to create, in ARCGIS, a color-coded map depicting the concentrations of radiological contamination of the surveyed area. This system is also useful for rapid turn-around of interim

An example of an ARC View/AutoCAD concentration map produced by Perma-Fix is shown in Figure 1. An ATV mounted multi-detector array with GPS is also pictured. Perma-Fix has successfully used such a system at several commercial and government sites throughout the world.

Figure 1. Example of Contaminant Concentration Map Produced using GPS/GIS Linked Radiological Survey Instrumentation





Detection and Characterization: Building Characterization and Radiological Measurement

Perma-Fix HUBLER™ technology is rugged and innovative equipment used for large area building/facility radiological survey and detection. All innovative instrumentation used by Perma-Fix for radiological building surveys are linked to state of the art data loggers that work in concert with our infrared robotic civil surveying equipment.

Survey data, times, and locations are collected simultaneously and are downloaded into Geographical Information Systems (GIS) software such as ARCGIS. Pre-survey grids are no longer necessary since the system acquires positions and detector measurements simultaneously. Survey units can be developed virtually, and data can be parsed after collection, allowing more surveyor efficiency.

The ARCGIS software interfaces with CAD drawings to create color graduated, three-dimensional survey maps. Perma-Fix has successfully utilized this approach on thousands of surveys, both indoors and outdoors. This technology allows for data reduction to be completed in a fraction of the time required than more conventional methods presently employed by the industry.

In large open floor areas and walls, Perma-Fix uses a large area (584 cm²) gas-proportional detector (constant flow). The detectors are modified to interface with our Trimble data loggers to simultaneously collect survey data and location coordinates. The detectors are mounted on motorized carts which maintain constant specified scanning speeds and distances from the surface. Perma-Fix links multiple detectors

depending on the specific locations and associated surface geometries to optimize scanning efficiency.

Overhead Component Scanning Instruments: In order to access the many different surface geometries in the overheads of buildings, Perma-Fix uses a variety of hand-held portable instrumentation coupled with a data logging technology as described above.



Perma-Fix Large Area Wall and Floor Scanning Survey System successfully used for several government clients.

Instrumentation Rental, Calibration, and Repair Services

Perma-Fix operates one of the largest calibration, repair, and maintenance facilities in the United States, and has successfully provided radiological and industrial hygiene instrumentation services for more than 15 years. Our instrumentation services include world-wide rental, calibration, and maintenance for radiological and industrial hygiene monitoring instruments

to all market sectors. With more than 5,000 instruments in inventory, availability and fast delivery are guaranteed. We offer long-term and short-term lease options at affordable rates as well as professional consultation for custom instrumentation application and development.

PERMA-FIX OFFERS:

- » \$1.2M Repair/maintenance parts inventory to support expedited completion of tasks at reduced cost;
- » 15-year history in servicing government clients worldwide with radiological/IH equipment and advanced survey instrumentation and technologies;
- » State-of-the-art instrumentation center that has proven to provide a low risk, low cost, rapid (timeliness) and highest quality option to all clients for calibration, repair, and maintenance;
- » Radiological Instrumentation Management (calibration, maintenance, repair, and tracking);
- » Industrial Hygiene Equipment Rental;
- » Radiological Instrument Rental;
- » Instrument Calibration and Maintenance Services;
- » GPS Walkover Survey Instrumentation;
- » Radiological Instrumentation for On-Site Laboratories.

Pennsylvania Office: Andrew J. Lombardo, CHP
Senior Vice President &
Nuclear Sales Manager
(724) 728-3960 office
alombardo@perma-fix.com

Tennessee Office: Eric Laning
Program Manager, Technical Services
(865) 251-2075 office
elaning@perma-fix.com

Instrumentation Lab
10512 Lexington Drive, Suite 200
Knoxville, TN 37932
(800) 905-0501 or (865) 342-3924